

CLAIMS

1. A micro-electromechanical variable capacitor comprising first and second capacitor plates defining facing surfaces which are spaced apart to define a gap, and means for applying a potential difference across the gap, at least one of the plates being movable relative to the other such that when a potential is applied across the gap the width of the gap is varied as a function of the applied potential so as to vary the capacitance of the capacitor, wherein the facing surface of at least one plate has a roughened surface, the degree of roughness being sufficient to prevent the facing surfaces adhering together.
2. A micro-electromechanical variable capacitor according to claim 1, wherein the means for applying a potential difference is configured to apply the potential difference across the facing surfaces of the plates.
3. A micro-electromechanical variable capacitor according to claim 1, wherein the first capacitor plate defines at least one control electrode, the means for applying a potential difference being configured to apply the potential difference across the (or each) control electrode and the second plate.
4. A micro-electromechanical variable capacitor according to claim 3, wherein the first capacitor plate defines an active electrode on which said facing surfaces is defined.
5. A micro-electromechanical variable capacitor according to claim 4, wherein the gap between the active electrode and the second capacitor plate is less than that between the (or each) control electrode and the second capacitor plate.

6. A micro-electromechanical variable capacitor according to claim 4 or 5, wherein the active electrode is disposed in between two control electrodes.
7. A micro-electromechanical variable capacitor according to any preceding claim, wherein the second capacitor plate is movable and the first capacitor plate is fixed.
8. A micro-electromechanical variable capacitor according to claim 7, wherein the second plate is flexible and is movable by virtue of its flexibility.
9. A micro-electromechanical variable capacitor according to claim 8, wherein the second plate comprises a pair of anchor members that are fixed relative to the first plate and an intermediate portion that is flexible and moveable.
10. A micro-electromechanical variable capacitor according to claim 9, wherein the intermediate portion of the second plate is substantially planar.
11. A micro-electromechanical variable capacitor according to any preceding claim, wherein the facing surface of the first plate has a roughened surface.
12. A micro-electromechanical variable capacitor according to any preceding claim, wherein the facing surface of the second plate has a roughened surface.
13. A micro-electromechanical variable capacitor according to claim 12 as dependent upon claim 11, wherein the roughened surface of the facing surface of the second plate is dissimilar to the roughened surface of the facing surface of the first plate.

14. A micro-electromechanical variable capacitor according to claim 13, wherein the dissimilarity is at least in part caused by the action of a sacrificial material used in the fabrication process.
15. A micro-electromechanical variable capacitor according to claim 13, wherein the dissimilarity is at least in part caused by electroplating.
16. A micro-electromechanical variable capacitor according to any preceding claim, wherein the first plate is fixed to a substrate.
17. A micro-electromechanical variable capacitor according to any preceding claim, wherein at least the facing surface of the (or each) plate with a roughened surface is fabricated by electroplating with a metal.
18. A micro-electromechanical variable capacitor according to claim 14, wherein at least the facing surface of the (or each) plate with a roughened surface is fabricated from electroplated nickel or gold
19. A micro-electromechanical variable capacitor according to any one of claims 4, 5 or 6, wherein at least the facing surface of the active electrode is fabricated by electroplating.
20. A method for fabricating a micro-electromechanical variable capacitor having first and second capacitor plates defining facing surfaces which are spaced apart to define a gap, and means for applying a potential difference across the gap, at least one of the plates being movable relative to the other such that when a potential is applied across the gap the width of the gap is varied as a function of the applied potential so as to vary the capacitance of the capacitor, the method comprising the step of fabricating at least one plate with a roughened facing surface, the degree of roughness being sufficient to prevent the facing surfaces adhering together.

21. A method according to claim 20, wherein at least the facing surface of the first plate is fabricated by electroplating.
22. A method according to claim 20, wherein at least the facing surface of the second plate is fabricated by electroplating.
23. A method according to claim 20, 21 or 22, further comprising the steps of fabricating the first plate with a roughened surface, fabricating an overlying intermediate layer such that the roughness of the facing surface is repeated on an upper surface of the intermediate layer and then fabricating the second plate over the intermediate layer such that its facing surface is formed with an inverse of the upper surface of the intermediate layer, and then removing the intermediate layer.
24. A method according to claim 23, wherein said intermediate layer is removed by etching.
25. A method according to any one of claims 23 or 24, wherein the intermediate layer is a sacrificial layer fabricated from titanium.
26. A method according to claim 23, 24, or 25, wherein the sacrificial layer introduces further roughness to the facing surface of the second plate.
27. A method according to claim any one of claims 20 to 26, wherein the first capacitor plate is fabricated to have at least one control electrode, the means for applying a potential difference being configured to apply the potential difference across the (or each) control electrode and the second plate.

28. A method according to claim 26, wherein the first capacitor plate is fabricated to have an active electrode on which said facing surface is defined
29. A micro-electromechanical variable capacitor substantially as hereinbefore described with reference to the accompanying drawings.
30. A method for fabricating a micro-electromechanical variable capacitor substantially as hereinbefore described with reference to the accompanying drawings.